

Forest Pest Management
Doraville Field Office

Report #83-3-2
November 1982

BIOLOGICAL EVALUATION OF SOUTHERN PINE BEETLE
INFESTATIONS ON THE BIG THICKET
NATIONAL PRESERVE IN ~~TEXAS~~

BIOLOGICAL EVALUATION OF SOUTHERN PINE BEETLE
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NATIONAL PRESERVE IN TEXAS

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ABSTRACT

An aerial survey covering 37,680 acres and ground checks of ten observed spots indicate that southern pine beetle (SPB) (Dendroctonus frontalis Zimm.) activity is increasing on the Big Thicket National Preserve. Fifteen areas of dead and dying pines suspected of being SPB infestations were located within the boundaries of the Beech Creek, Turkey Creek, and Lance Rosier units of the Preserve (Figure 1). The results of ground checks of ten suspected spots indicate that 40% of these spots were currently infested by SPB. Susceptible host type (pine, pine-hardwood) covers 15,777 acres of the areas being evaluated.

INTRODUCTION

An aerial detection survey of the Beech Creek, Turkey Creek, and Lance Rosier units was conducted on October 25, 1982 by personnel from the Big Thicket National Preserve and Forest Pest Management's Aerial Survey Team. Fifteen areas of dead or dying pines were observed. These areas were suspected of being SPB infestations because of the crown colors and the pattern of dead and dying pines.

Southern pine beetle infestations in Texas have occurred since at least 1882 (Price and Doggett, 1978). More recently, SPB infestations have been present in Tyler and Hardin Counties (location of the Turkey Creek, Beech Creek, and Lance Rosier units) each year from 1963 to the present.^{1/} During 1976-1977 SPB infestations at epidemic levels affected 1500 acres of pine type on the Big Thicket National Preserve. This epidemic ended in the fall of 1977 when the southern pine beetle population collapsed. From that time to the present little SPB activity has occurred on the Preserve.

This evaluation was conducted to determine the present status and trend of SPB populations on the Big Thicket Preserve. Entomologists from Forest Pest Management's Doraville and Alexandria Field Offices, and National Park Service personnel conducted the evaluation October 26-28, 1982

METHODS

Standard aerial sketch mapping procedures were used to conduct the aerial survey. Three observers viewed a .5 mile wide strip on both sides of the aircraft. Flight lines were spaced so that a 100% survey resulted. Areas of red and dying pines and an estimated number of trees per spot were recorded on National Park Service administrative maps (Figures 2, 3, 4).

^{1/} Personal communication with Mr. Joe Pase, Texas Forest Service.

Figure 1--Map showing locations of Big Thicket National Preserve units.

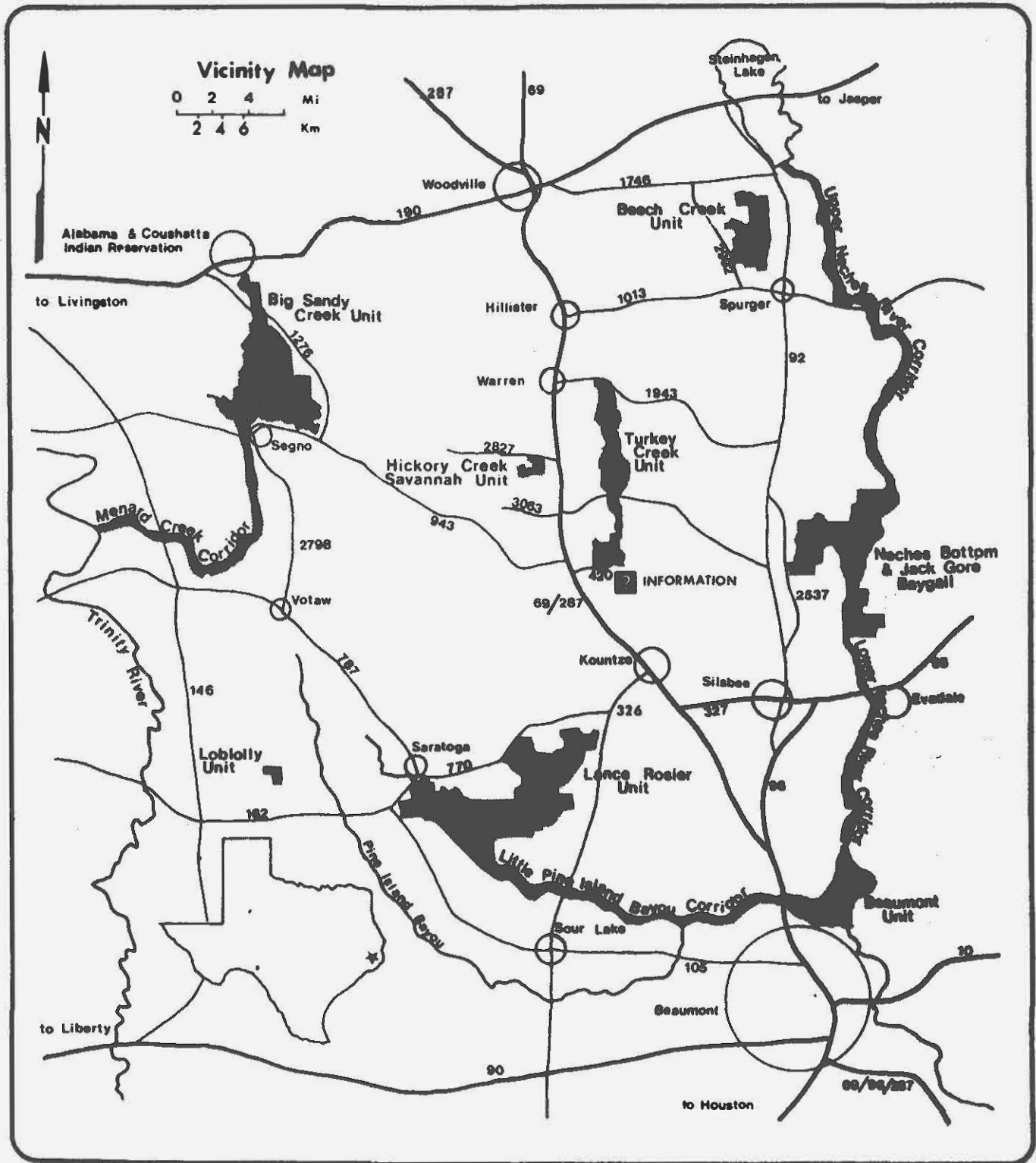
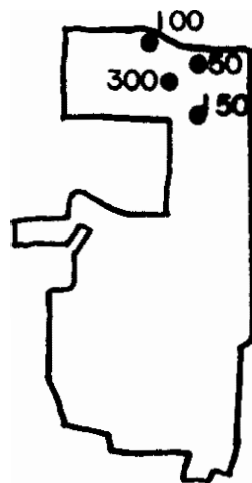


Figure 2--Outline map showing approximate location of suspected southern pine beetle infestations.



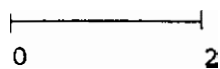
Beech Creek Unit

Legend ●¹⁰ - location of suspected SPB infestations
and number of trees affected

0 2
scale in miles

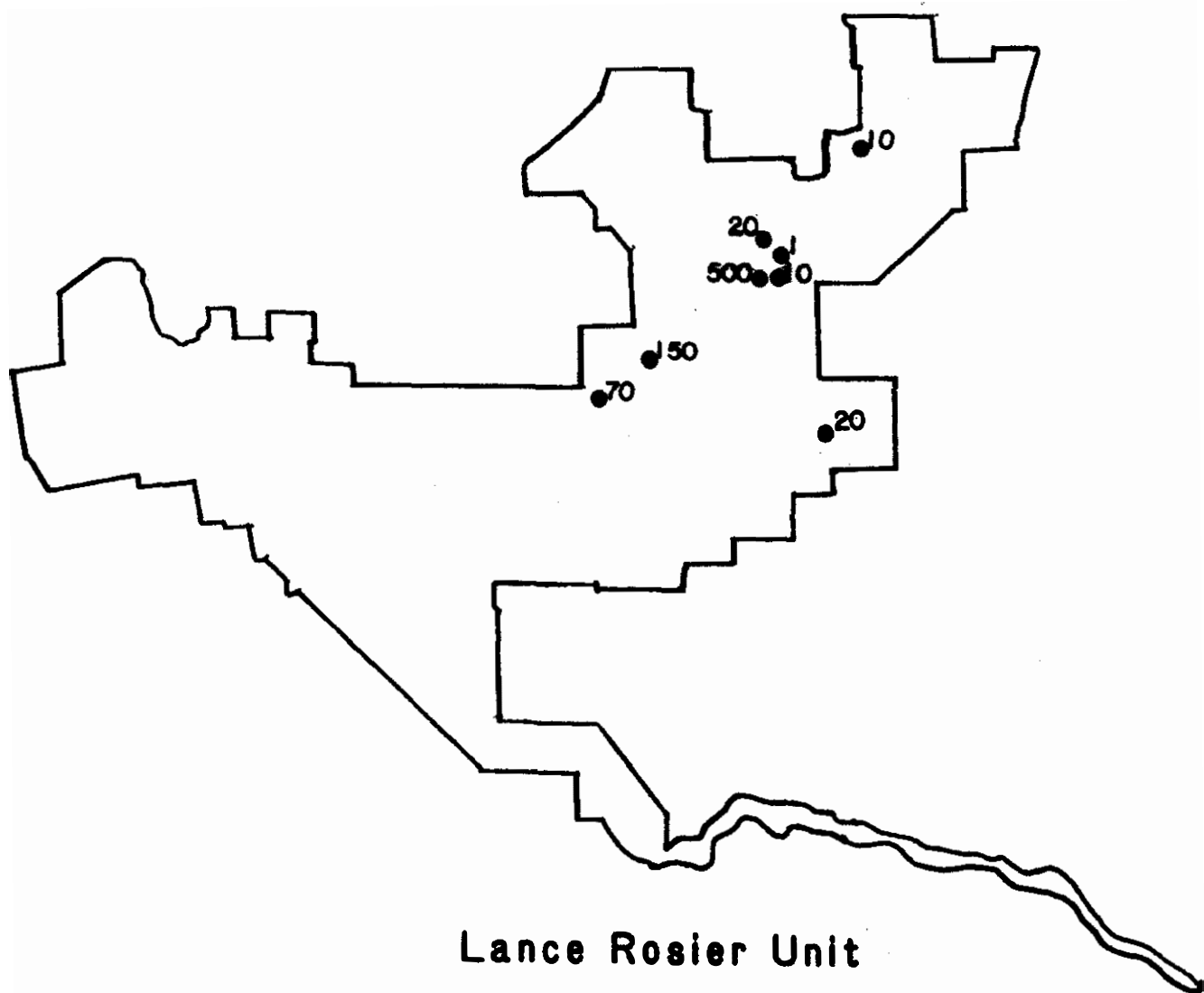
A map of the study area, showing the coastline of the Gulf of Mexico. The map is oriented vertically, with the coastline on the left and the Gulf of Mexico on the right. The coastline is irregular, with many bays and peninsulas. The Gulf of Mexico is labeled 'GULF OF MEXICO' at the top. The study area is labeled 'STUDY AREA' at the bottom. The map shows the locations of the 10 study sites, marked with black dots and labeled '10'.

Legend ●¹⁰ - location of suspected SPB infestations
 and number of trees affected



scale in miles -4-

Figure 4--Outline map showing approximate location of suspected southern pine beetle infestations.



Legend ●¹⁰ - location of suspected SPB infestations
and number of trees affected

0 2

scale in miles -5-

Ten of the areas detected during the survey were ground checked. At each area, the causal agent was identified, the number of infested and vacated trees by crown color (green, fading, red, or black), diameter, height, basal area and average age were recorded.

RESULTS

The aerial survey detected 14 multiple tree spots and one single tree spot within the boundaries of the three units being evaluated. Table 1 shows the distribution of spots by size class and administrative unit.

Of the ten spots ground checked, four areas were currently infested by SPB, three spots were inactive, two spots were infested by Ips bark beetles (*Ips* spp.) and black turpentine beetles (*Dendroctonus terebrans* Oliv.) and one spot observed from the air was actually an area of pines exhibiting normal needle drop. The number of infested trees in the active SPB spots ranged from 38 to 132. The percent of trees infested within these active spots ranged from 17 to 49%. Green:red tree ratios ranged from a low of .3:1 to a high of 1.7:1.

DISCUSSION

Southern pine beetle activity varies with the season of the year. During the warm summer months infestations tend to grow in size. The presence of attractants, short time required for the completion of a generation, and rapid deterioration of infested trees tend to concentrate beetles in and maintain the expansion of spots. During the fall season, infestations slow down as far as spot growth is concerned, partly because of cooler temperatures and longer times required for beetle development. It is during the fall and spring that many beetles disperse from active spots and infest trees which may be some distance from the point of dispersal. When warmer temperatures occur during the late spring and early summer beetle activity increases and many new previously undetected spots may appear.

Because of the timing of this evaluation and the transition of the beetle into the dispersal mode, it is difficult to predict what if any spot growth may take place for the remainder of this year. Likewise, it is difficult to predict how serious a problem SPB will pose for next year.

From the observations made during the evaluation it is apparent that the population has gone into the dispersal mode. It is impossible to estimate the number of additional spots which may appear next year as a result of dispersal. These new infestations will be difficult to detect until warmer weather hastens crown color changes.

Currently, southern pine beetle populations are increasing in Texas and the southeastern states in general. Should suppression activities become necessary on the Big Thicket Preserve to protect aesthetic values, wildlife habitats or prevent infestations from impacting adjoining private lands, two suppression strategies compatible with National Park Service policy are presented.

- (1) Piling and Burning - SPB infestations can be suppressed by cutting, piling, and thoroughly burning the bark of infested trees. The entire bark surface must be thoroughly burned to insure complete destruction of the brood. The order of priority for cutting, piling, and burning infested trees is as follows: (a) trees with fresh attacks and having young broods (usually the green, recently infested trees) (b) trees having nearly developed broods (usually the red and fading trees).

Table 1.--Distribution of Spots by Size Class and Administrative Unit

<u>Beech Creek</u>							
Spot Size Categories							
	1	2-5	6-10	11-25	26-50	51-100	101+
# of spots	0	0	0	0	1	1	2

<u>Turkey Creek</u>							
Spot Size Categories							
	1	2-5	6-10	11-25	26-50	51-100	101+
# of spots	0	0	3	0	0	0	0

<u>Lance Rosier</u>							
Spot Size Categories							
	1	2-5	6-10	11-25	26-50	51-100	101+
# of spots	1	0	0	3	0	1	3

- (2) Cut-and-leave - This method reduces losses from spot growth and proliferation during the summer months. Cut-and-leave is designed to disrupt spot growth in small to medium-sized spots. (≤ 40 active trees) by dispersing emerging beetles. The following procedure is recommended when using the cut-and-leave strategy:

- (a) Identify all active trees in the spot.
- (b) Fell all active trees toward the center of the spot.
- (c) Fell a horseshoe shaped buffer of green uninfested trees around the most recently attacked trees at the head of the spot and leave them lying on the ground with their crowns pointed toward the center of the spot. The buffer should be as wide as the average height of the trees in the stand.

Cut-and-leave treatments should only be applied during the summer months between June and October. Spots with 10 or more infested trees should be treated first.

Re-examination of treated areas should be conducted 2-3 weeks after treatment to insure that all active trees were found when using either suppression procedure. Vacated trees should be left standing to allow developing parasites and predators of SPB to complete their development.

Some biological control is occurring within the current infestations. Large numbers of clerid beetle larvae (Thanasmius dubius F.) were observed in infested trees. Woodpecker predation was also noted. However, control of SPB infestations by parasites and predators is accomplished over a long period of time and cannot be relied on to provide quick suppression of aggressive or critical infestations.

REFERENCES

Price, Terry S. and Coleman Doggett. 1978. A history of southern pine beetle outbreaks in the southeastern United States by the southern forest insect working group. Georgia Forestry Commission.